Enterprise Applications in a Heterogeneous Environment

Session 627

Enterprise Applications in a Heterogeneous Environment

Tom Goguen
Director, Product Marketing
Apple
tgoguen@apple.com

Agenda

- Infosys
  - Enterprise IT architecture
  - Customer scenarios
  - Best practices
- Sybase
  - Solutions for Mac OS X
  - Case studies
- Q&A

What You'll Learn

- Why and when to use Apple technologies in a heterogeneous enterprise
- Technical implementations in an enterprise
- Benefits of Sybase solutions

Enterprise Applications in a Heterogeneous Environment

Amiteshwar Seth
Senior Technical Architect
Infosys
amiteshwards@infosys.com

Agenda

- About Infosys
- Enterprise IT architecture
  - Major components
  - Customer scenarios
- Best practices

Infosys—A Technology Consulting Leader: Infosys is a Pioneer in the Globally Distributed Delivery of Technical Solutions…

- Partnering for Technology-led Business Transformation
- First Indian Company to List on the NASDAQ
- Forbes' list of "20 for 2000"
- First Indian Co. to be certified CMMI
- Over 15,000 people strong, and growing

- 370+ clients (Over 70% Fortune 2000 names)
- 85% repeat business; average length of relationship 4 years
- 95% on time, on budget or better
- First Indian IT company to setup business consulting group
- Pioneered the Offshore Development Center model
- 35 offices in 15 countries

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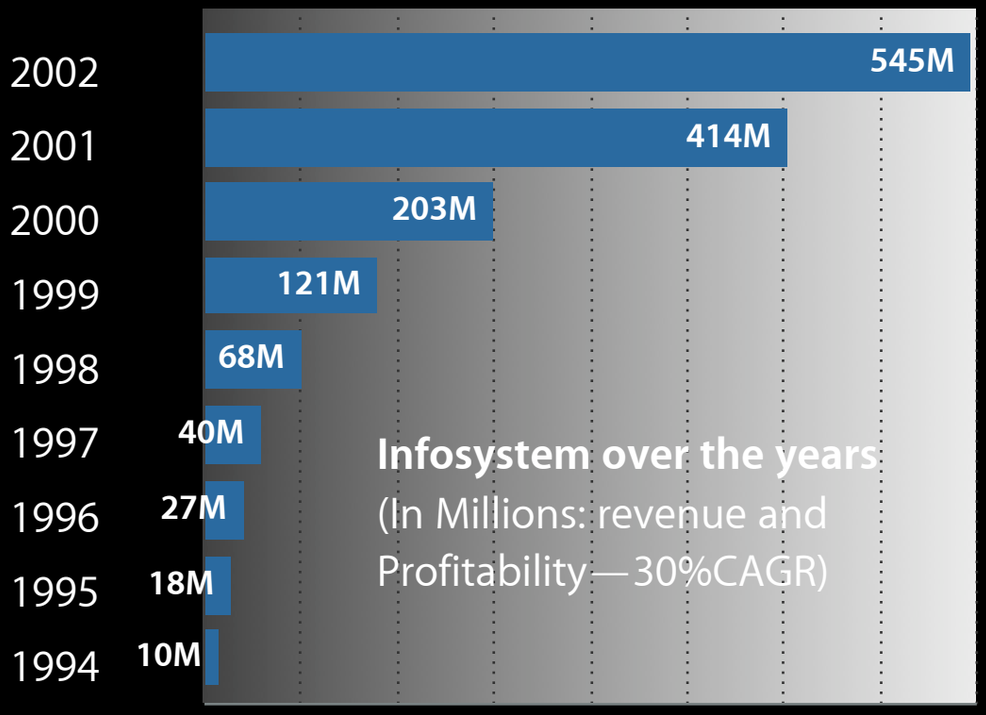
Financial Stability and Integrity: Infosys Regularly Wins Accolades for its Transparency in Financial Matters, as Well as Our Stellar Fiscal Performance…



- $750 mill in FY2003
- Zero debt
- High cash and cash equivalents—235M USD
- Total Assets—530M USD
- All the employees are covered under ESOP to foster the spirit of entrepreneurship

Enable global corporations adopt new economy business models through innovative technology solutions and services

NORDSTROM · Deutsche Bank · AON · MARSH · SUNCORP METWAY · NEW YORK LIFE · Northwestern Mutual · HERBALIFE.com · IKON · adidas · TOSHIBA · AVERY DENNISON · PROVIDIAN · citibank · Ætna · Reebok · Harrah's · Franklin Resources, Inc · Paramount

Partner with technology leaders to build new products and businesses

SAP · INFORMATICA · i2 · TIBCO The Power of Now · ORACLE · PeopleSoft · manugistics · YANTRA · Cisco Systems · Sun microsystems · Microsoft · SIEBEL · INTERWOVEN

Enterprise IT Architecture

Thick Client

- View Controller
- State Management
- Transaction Services
- Request Manager
- Thread Manager
- Error Handling
- Internationalization
- Validation Services

Business Components

- Rules Engine
- Helper Objects
- Framework Support

Client Access Services

- Application Server
- Streaming Server
- Web Server

Application Security Services

- Authentication and User Profile

Enterprise API's

- Interfaces
- Persistence Services
- Transaction Services
- Data Collection Services
- Data Distribution Services

Browsers

Client Platform

Java VM

Bus Services

- DNS
- Dir. Srvs.
- CORBA
- COM
- IIOP

Security

- I/O Services
- **Operating System**
- Network Services

- Processor H/W
- **Server Platform**
- I/O Devices

TCP/IP

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Enterprise IT Architecture

From a System Integrator's perspective, enterprise architecture is divided into eight main categories

1. Client Solutions
2. Business Components
3. Client Access Services
4. Application Security Services
5. Enterprise API's
6. Bus Services
7. Operating System services
8. Server Platform

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Client Solutions

In an Enterprise IT environment, client solutions should integrate transaction services, security, distribution, and deployment options available in an enterprise

- **Major considerations**
  - Transaction and security
    - Interoperable with existing infrastructure
    - Native support for security frameworks
    - System level support for complex transaction models (multithreaded, shared memory…)
  - Distribution and deployment
    - Conforms with existing IT strategy
    - Re-use existing software repositories

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Implementation Scenario: Mobile Sales Application

- **Customer Situation**
  - Field sales representatives mainly equipped with Apple powerbooks
  - Multiple sales teams across globe used custom built, non-integrated solutions
  - Losing business because of longer and inefficient processing time
- **Customer's Business Need**
  - Better collaboration between sales teams
  - Forecasting and opportunity pipeline visibility to senior management

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Mobile Sales Application

- **Customer Solution Required**
  - Offline solution on Macintosh
  - Ability to integrate with enterprise CRM package
- **Why is Apple the Best Solution?**
  - Sales representatives were already using Apple hardware
  - Cocoa with objective C allowed rapid client application development
  - Server utilizes native Java available on Mac OS X

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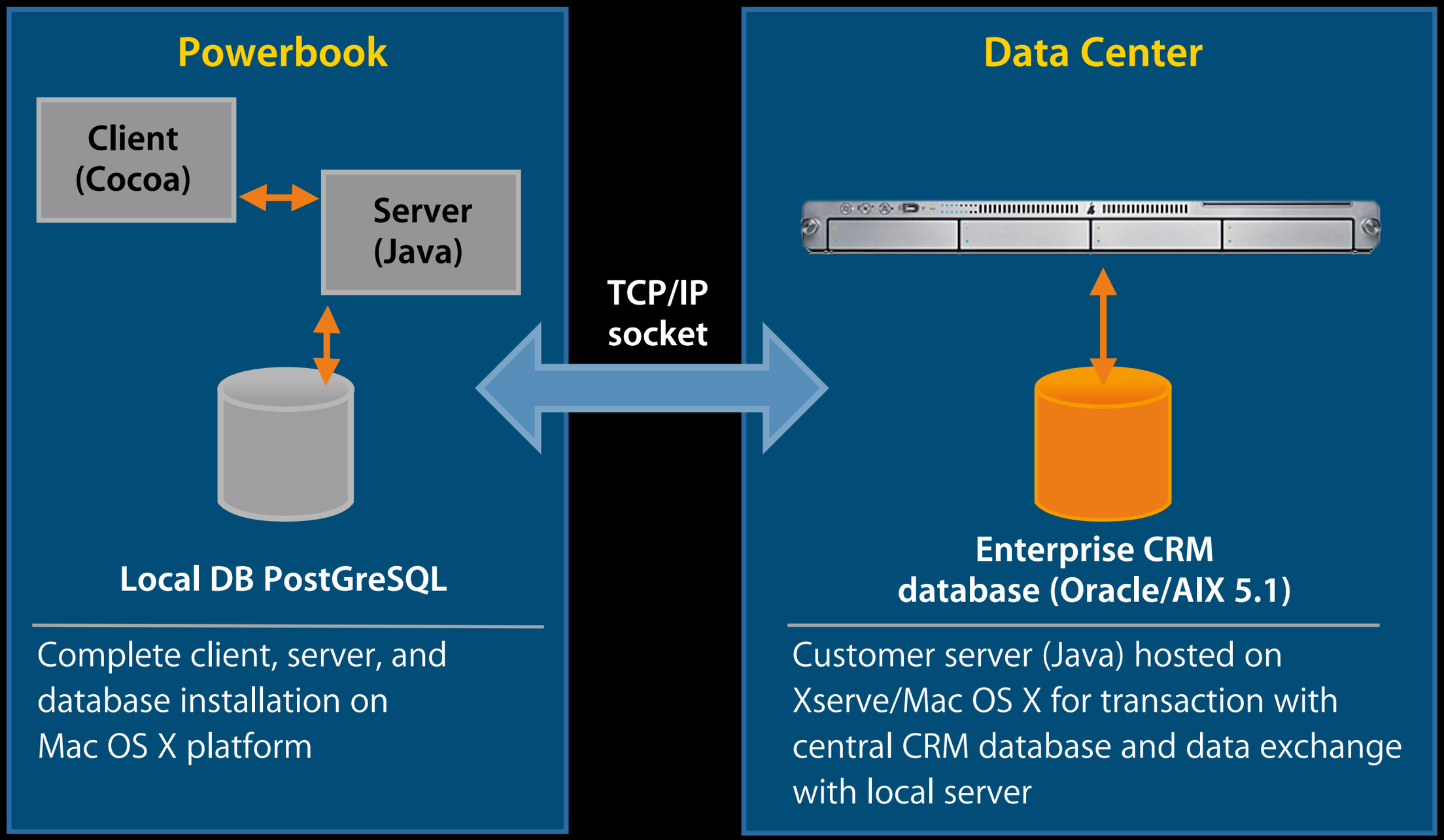
Technology Implementation



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Business Components

Business components are reusable and customizable components that can be used across multiple applications

- **Major Considerations**
  - Set of functions or services provided by the components
  - Independent development, delivery and installation
  - Interface specification

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Implementation Scenario: Automated Fax Integration Application

- **Customer Situation**
  - Employees have to submit expense receipts to the Company for reimbursement
  - Expenses are submitted through an application and actual bills are sent by post
  - Very high administrative overhead with large number of geographically dispersed employees
- **Customer's Business Need**
  - Reduce administrative overhead with process automation

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Automated Fax Integration Application

- **Customer Solution Required**
  - Electronic submission of bills with expense details
- **Why is Apple the Best Solution?**
  - Supports open source framework
  - Low-cost solution
  - Easy to monitor and maintain
  - Easy to integrate with existing infrastructure

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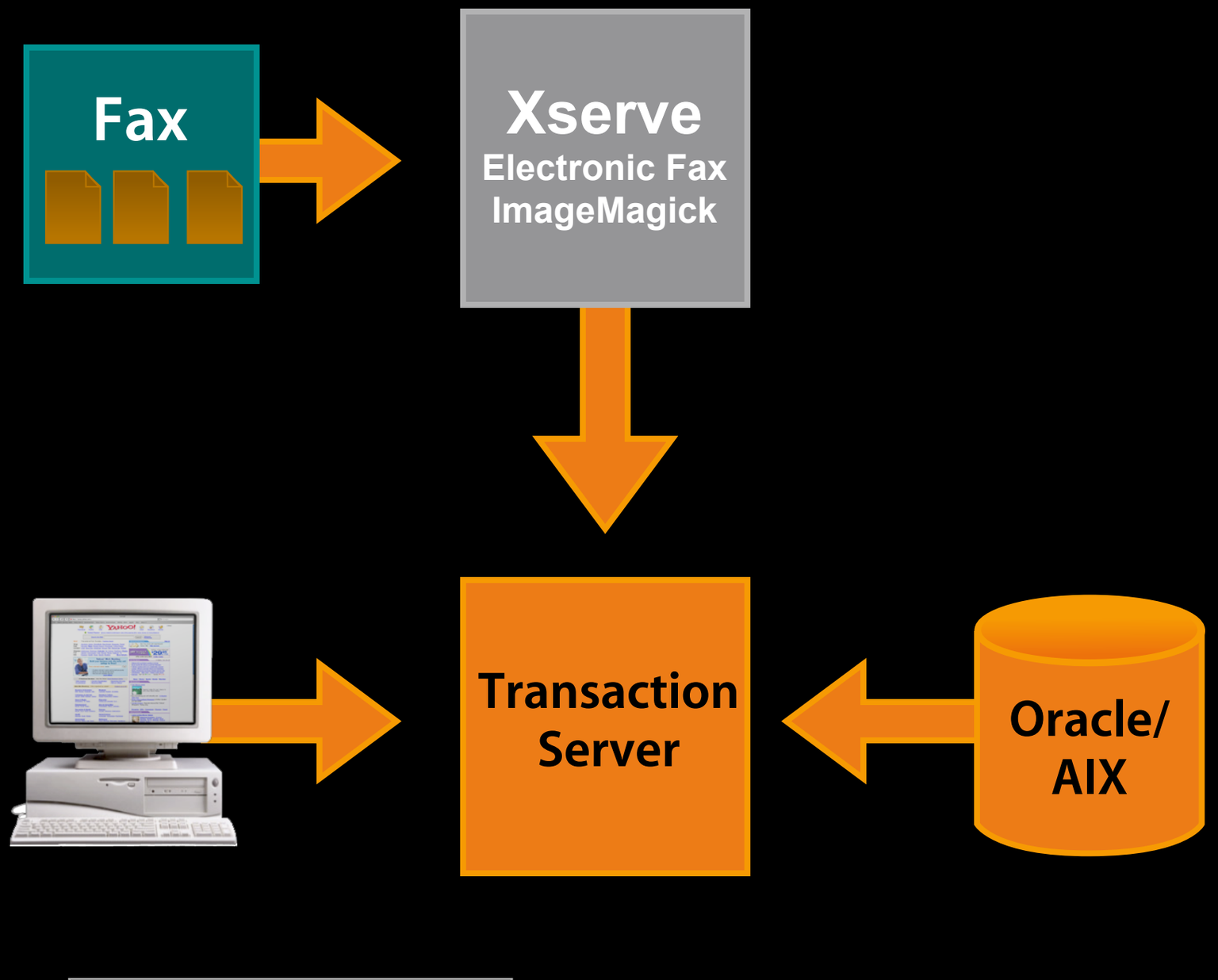
Technology Implementation



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Client Access Services

Client access services should be flexible to adapt to existing heterogeneous environment, comply with defined industry standards, and be scalable and reliable

- **Major Considerations**
  - Web Servers
    - Standards compliant, customizable, maintainable, reliable
  - Streaming Servers
    - Plug In API, standards support, reliability, scalability
  - Enterprise Java Application Servers
    - Scalability, reliability, standards support, maintainability

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Implementation Scenario: Web Interface to Native HR Application

- **Customer Situation**
  - Existing HR application
  - Employees on the move required a web interface to parts of HR application
  - Cost constraints on the solution to be developed
- **Customer's Business Need**
  - Providing access to HR application anytime/anywhere
  - Facilitating efficient and speedier decision making from management

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Web Interface to Native HR Application

- **Customer Solution Required**
  - Re-use as many parts of existing HR application as possible
- **Why is Apple the Best Solution?**
  - WebObjects/Mac OS X
  - Extreme rapid development with WebObjects
  - Low-cost deployment with WebObjects/Apache/OS X on Xserve
  - Flexibility to utilize existing application infrastructure

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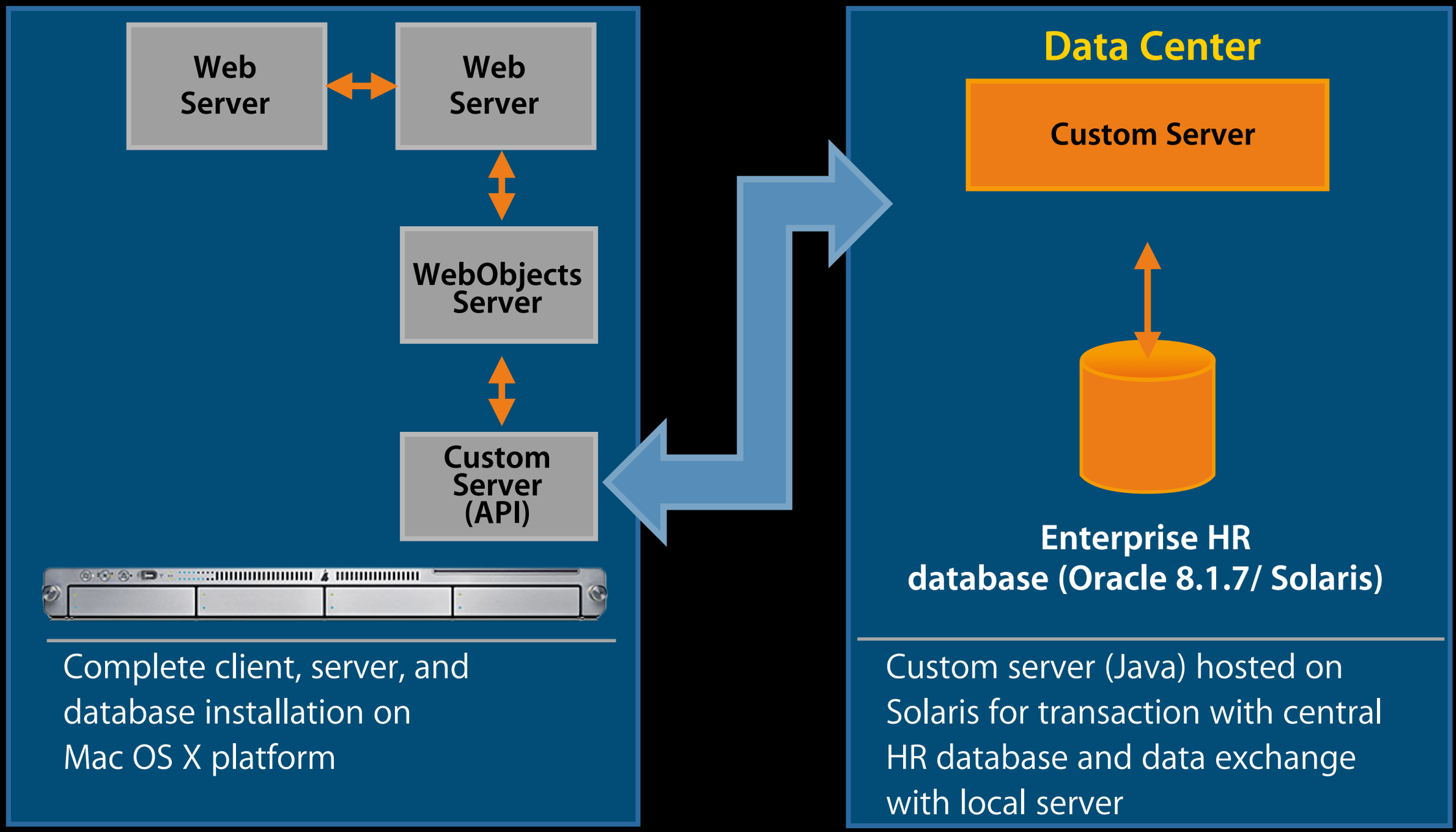
Technology Implementation



Enterprise APIs

A set of APIs designed to simplify the creation of large-scale commercial and database applications that can share data with other applications within an organization or across the Internet

- **Major Considerations**
  - Persistence Services: Saving states of non-transient instance variables
  - Transaction Services: Support for transaction models, multithreading
  - Data Access Services: Ease of accessing data from data sources
  - Data Distribution Services: Publishing/subscribing data from multiple sources

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Implementation Scenario: Call Center Solution

- **Customer Situation**
  - Losing business due to the lack of call center solution
  - Time-consuming, resource-intensive processes to track and report on customer calls
  - Needs integration with existing database and reporting applications
  - Current IT hardware resources utilized to full capacity
- **Customer's Business Need**
  - Satisfied customers—with efficient and speedier customer call tracking process
  - Better and timely reporting for management to address process issues in time

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Call Center Solution

- **Customer Solution Required**
  - Custom low-cost solution with ability to support high transaction volume and integrate to multiple data sources
- **Why is Apple the Best Solution?**
  - Server optimized version of Java
  - Low-cost enterprise application deployment with XServe/Mac OS X/JBoss
  - Support for open source technologies such as JBoss

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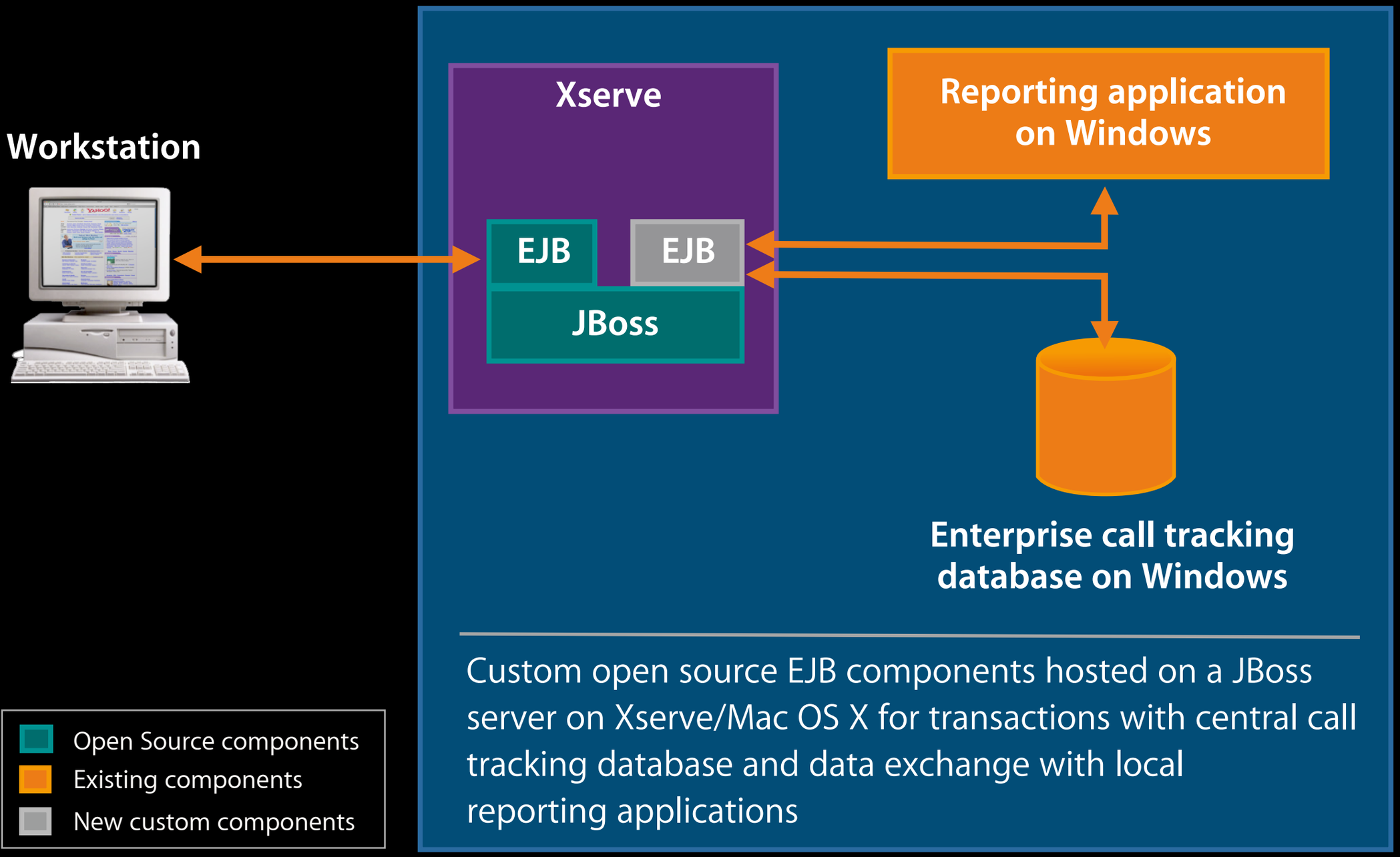
Technology Implementation



Custom open source EJB components hosted on a JBoss server on Xserve/Mac OS X for transactions with central call tracking database and data exchange with local reporting applications

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Operating System Services

In an Enterprise IT environment, network solutions should address storage and distributed computing

- **Major Considerations**
  - Storage
    - Interoperable with existing infrastructure
    - Native support for file server protocols
    - Fault tolerant and response time oriented
  - Distributed Computing Environment (DCE)
    - Scalability: processing performance increases as the number of hosts and the scale of the network is increased
    - Transparency: applications can run without being aware of the low-level implementation formats
    - Security: protect resources from network intruders

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Implementation Scenario: Data Storage Application

- **Customer Situation**
  - Multiple client applications need integrated DCE and network storage solution
  - Multiple host platforms
  - Space crunch on server racks
  - Geographically dispersed teams using different client applications need a fast and efficient way to exchange and store large sized files
- **Customer's Business Need**
  - Efficient and fast large data exchange between global teams
  - Low-cost file storage

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Data Storage Application

- **Customer Solution Required**
  - Low-cost storage solution
  - Rack space friendly server
  - Dovetail the solution with existing IT infrastructure
- **Why is Apple the Best Solution?**
  - XServe with Mac OS X provides low cost storage solution
  - XServe is one of the most rack friendly servers in 1U category
  - Apple's Mac OS X has native SMB/CIFS support and support for WebDAV, NFS and AFP. It can operate as a standalone file server solution in a heterogeneous environment.

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Technology Implementation

Geographical Location 1

Xserve

Client Windows workstations communicating with a server hosted on Xserve/Mac OS X for file access and with central database in US

TCP/IP socket

Server to server file distribution

Geographical Location 3

Xserve

Database Oracle on AIX 5.1

Windows workstations communicating with a server hosted on Xserve/Mac OS X for file access and with central database at this location

Geographical Location 2

Xserve

Client Windows workstations communicating with a server hosted on Xserve/Mac OS X for file access and with central database in US

Legend

- Existing components
- New custom components

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Best Practices

- Tools
  - Dedicated group to identify, build or buy tools
- Well defined process and methodologies for
  - Software delivery
    - Custom SI, Solution SI, Infrastructure SI
  - Technology Change Management

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Who to Contact

Raghavan Srinivasan
Engagement Manager
raghavan_s@infosys.com

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http://developer.apple.com/wwdc2003/urls.html

WebObjects

Sybase Enterprise Solutions for Mac OS X

Steve Olson
Technical Director
Sybase, Inc.
olson@sybase.com

Introduction

- This section will introduce you to Sybase and its data management software available on Mac OS X today
  - And touch on where we expect to be tomorrow

- We will describe how Sybase complements and extends Apple's Mac OS X platform with enterprise-ready data management software

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What You'll Learn

- Sybase adaptive server enterprise overview
  - How it works on Mac OS X
- Sybase replication server overview
  - What it is and what it does
- Programming interfaces, tools and solutions for ASE
- Case studies

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Who Is Sybase?

- Sybase provides database management and integration software to a wide range of customers for a wide range of applications:
  - "Wall Street runs on Sybase"
  - Financial services
  - Health care
  - Telecommunications
  - Government (federal, state, municipal)
  - Universities
  - And many more
- The same code base is used for Mac OS X
- Sybase is world-wide: our software is localized for every major language in the world

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Sybase Software on Mac OS X

- Available today
  - Adaptive Server Enterprise 12.5.0.3
  - Adaptive Server Anywhere 8.x
  - JDBC, ODBC, Open Client APIs
  - Open Server
- Later in 2003
  - Replication Server 12.6
  - Adaptive Server Enterprise 12.5.1
    - Leveraging specific attributes/features of Panther
  - Adaptive Server Anywhere 9.0

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Sybase Adaptive Server Enterprise

- Enterprise-class relational database management system
- First public release in 1987
- Optimized for on-line transaction processing (OLTP)
- Licensed to Microsoft in 1988
  (when it was Sybase SQL Server)
  - Because of this common heritage, ASE still contains high degree of compatibility with SQL Server
- SQL-92 Entry-level compliance
- Numerous extensions in Transact-SQL language

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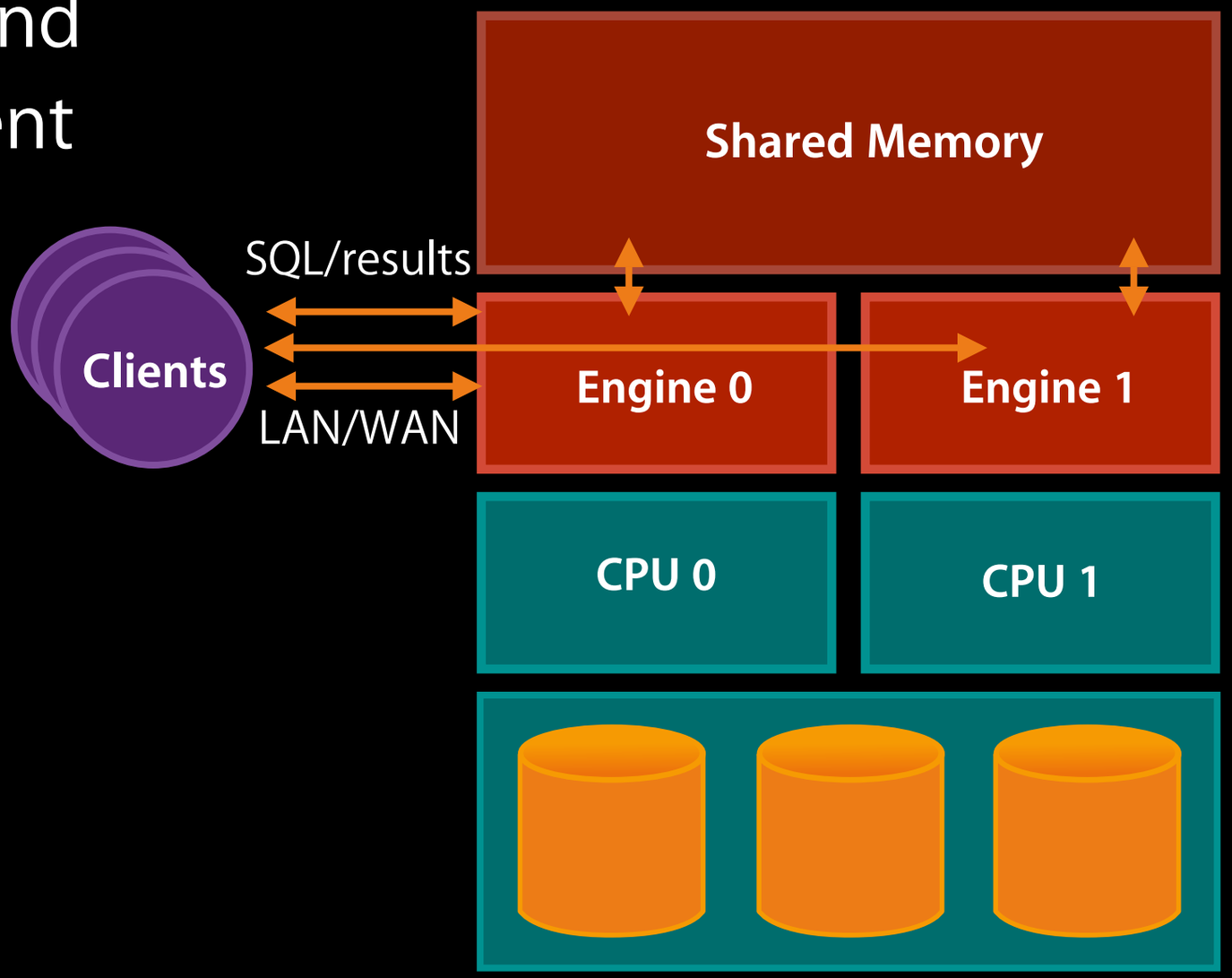
ASE: Integration with Mac OS X

- BSD development and run-time environment
- Rendezvous
- SNMP
- Open Directory
- Server Monitor
- Installation



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Rendezvous

- ASE registers with Rendezvous during startup
- Simple API enables registration with server-specific identification:

```
```

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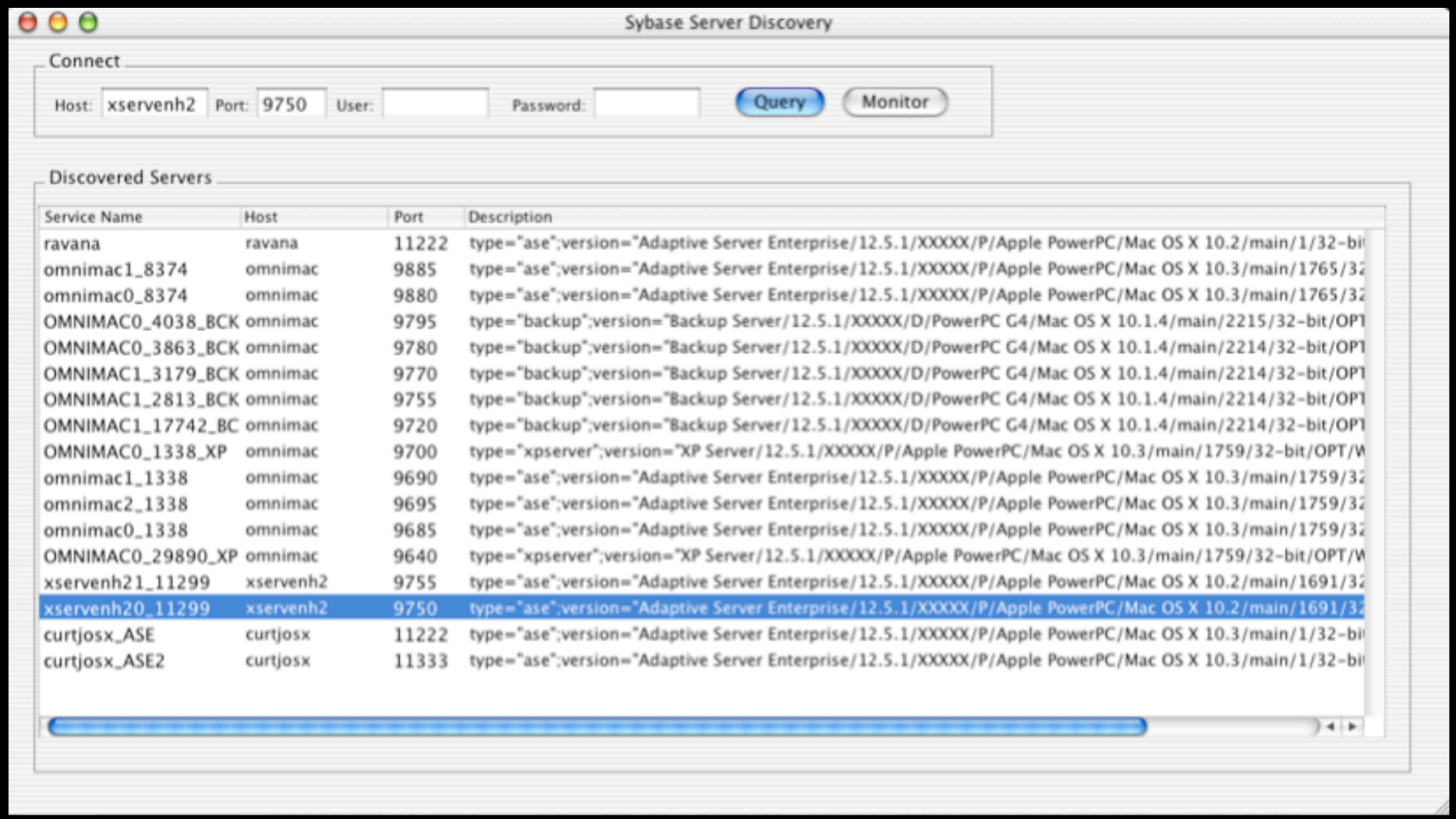
Rendezvous—(cont.)

- Server Discovery application is provided, showing all servers in local network currently running
- Can launch interactive query tool on demand (12.5.1)



SNMP

SNMP Console
(Openview, BMC Patrol,Tivoli, etc.)

SNMP (V1, 2c, 3)

SNMP Agent

Agent-X Protocol

SNMP Sub-Agent

RDBMS MIB
SYBASE MIB

Sybase Protocol

Adaptive Server

Backup Server

XP Server

Other OpenServer

Open Directory Authentication

Client Applications

Login request

Sybase Adaptive Server Enterprise

Open Directory API

Login authentication

Open Directory

LDAP

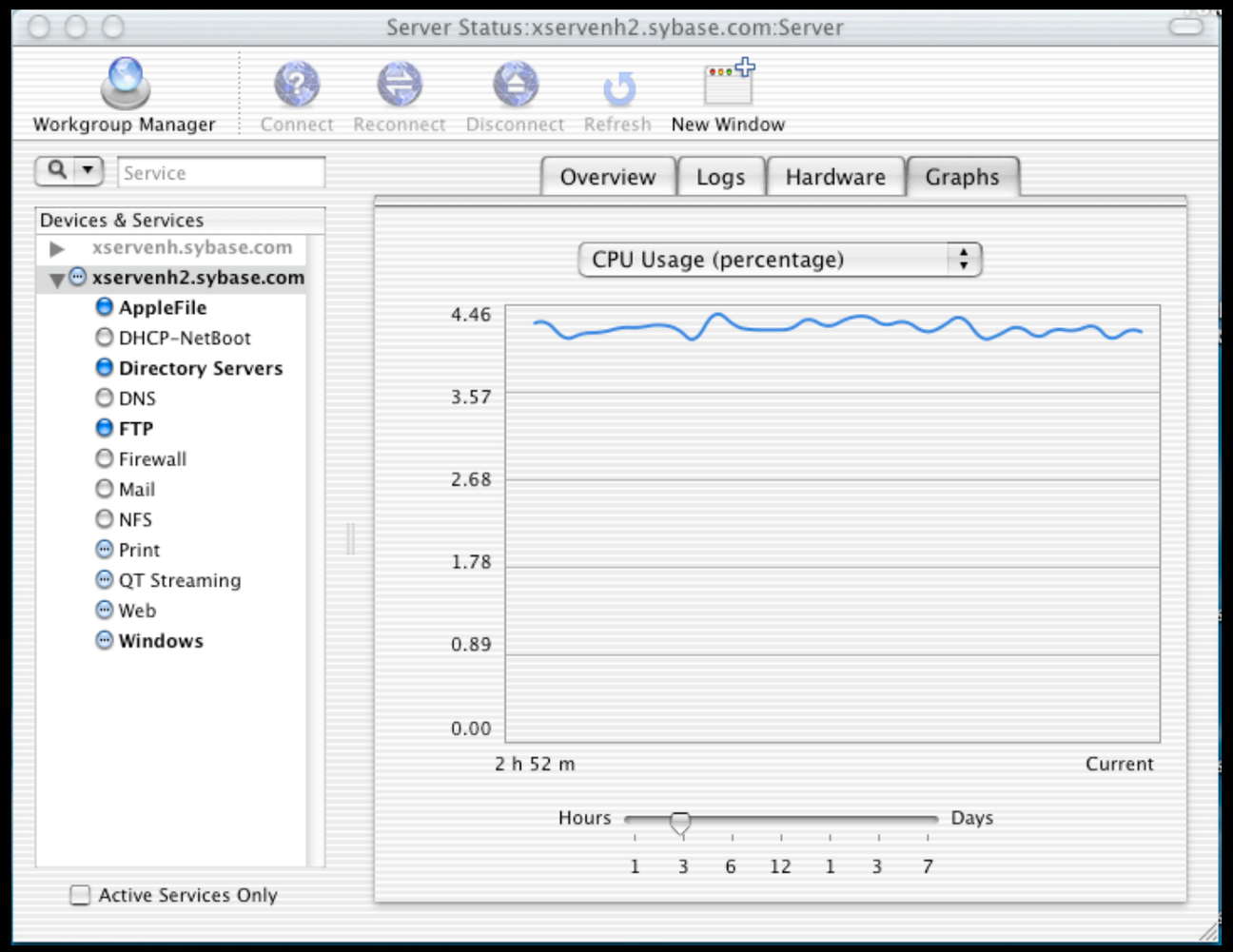
Active Directory

Kerberos

NIS

Server Monitoring and Configuration

- Sybase is extending Server Status/Settings tools to enable monitoring and some administration of its servers
  - Monitor CPU, network, databases, users
  - Start, stop, and configure servers
  - View logs



SYBASE

Co-Existence in A Heterogeneous World

Support for Federated Architectures

Client program on any platform

Database Client

Transact-SQL, via JDBC, ODBC, Open Client

Xserve

Sybase Adaptive Server Enterprise

Omni (CIS)

Full 2-Phase Commit
Transaction Coordination

DBMS
on any
Platform
in LAN or
WAN

Wrapper

Wrapper

Wrapper

Oracle

SQL Server

DB2

Other Sybase

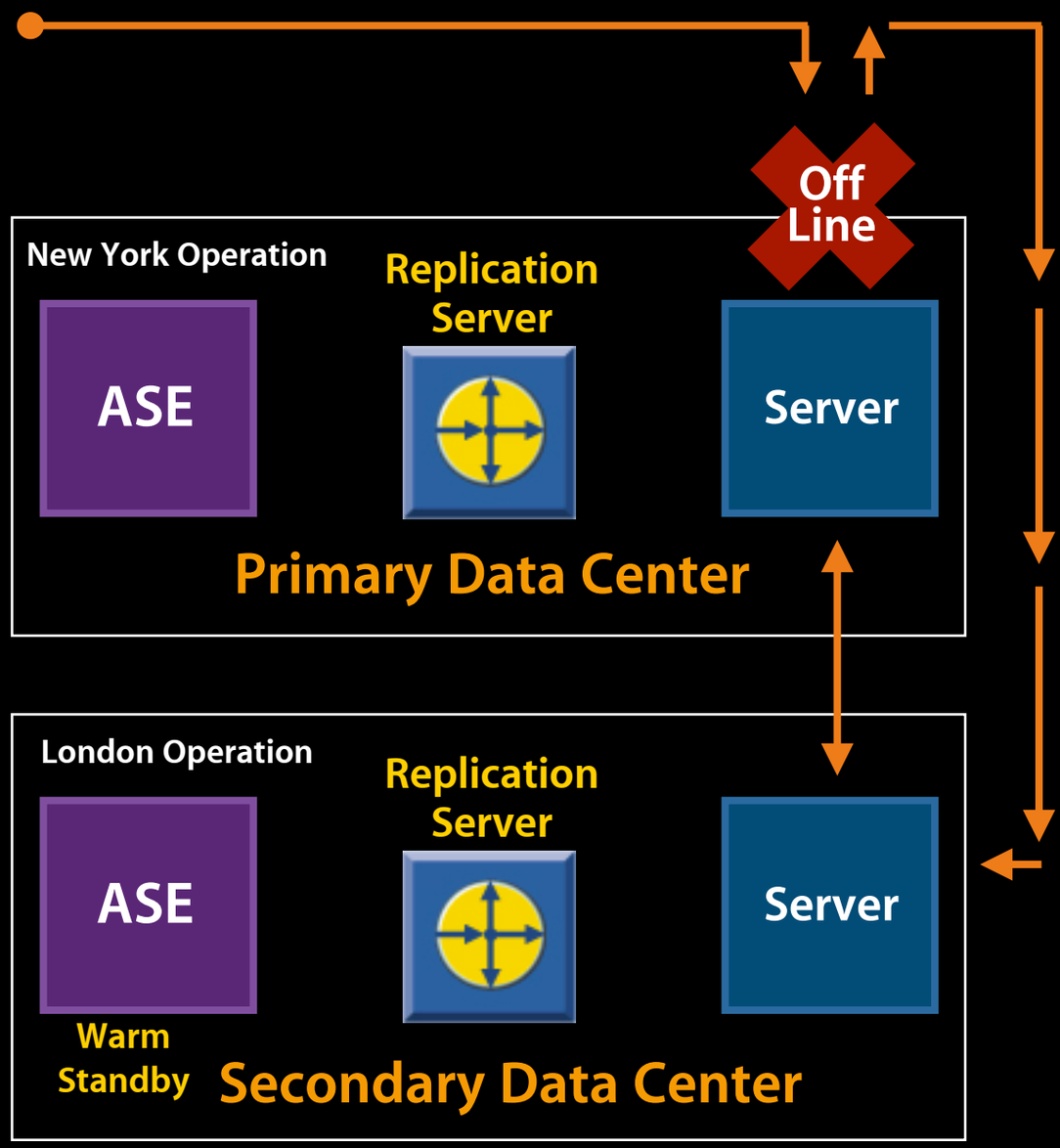
Replication Server

- High-availability solution that addresses all three areas of high availability:
  - Planned downtime
  - Unplanned downtime
  - Disaster recovery
- Data distribution/aggregation solution
- Key benefits
  - No geographic restriction—works across LAN/WAN network
  - Database integrity guaranteed
  - Redundant hardware can be leveraged for DSS or load balancing

SYBASE

Failover Scenarios

- Disaster Recovery
  - No geographic restriction
  - Physical separation over extended distances
- Unplanned Downtime
  - Automatic failover and synchronization of client connections
- Planned Downtime
  - For maintenance, upgrades
  - Provide secondary copy for DSS, reporting tasks



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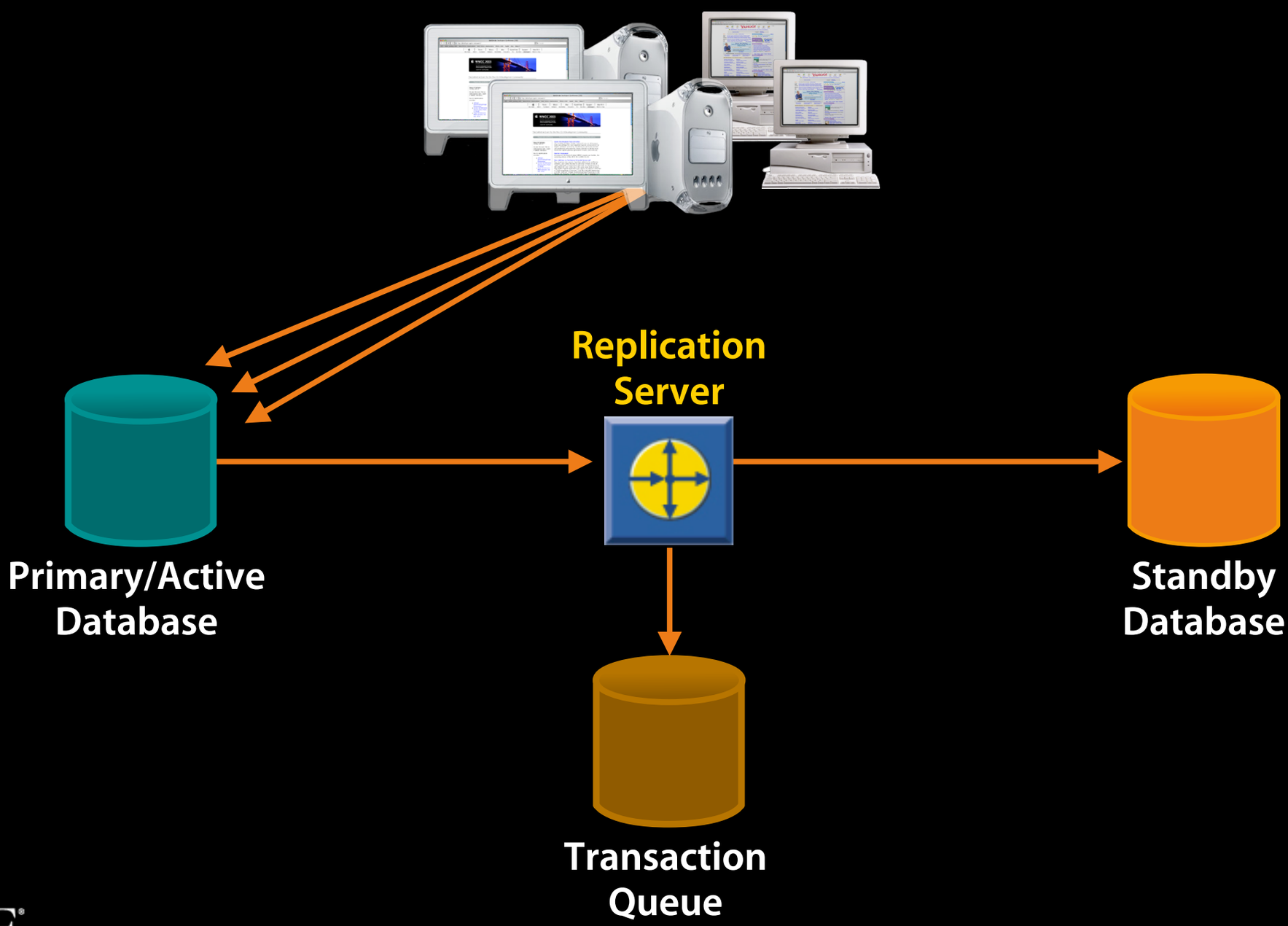
Warm Standby

- Bi-Directional Synchronization—normal operation



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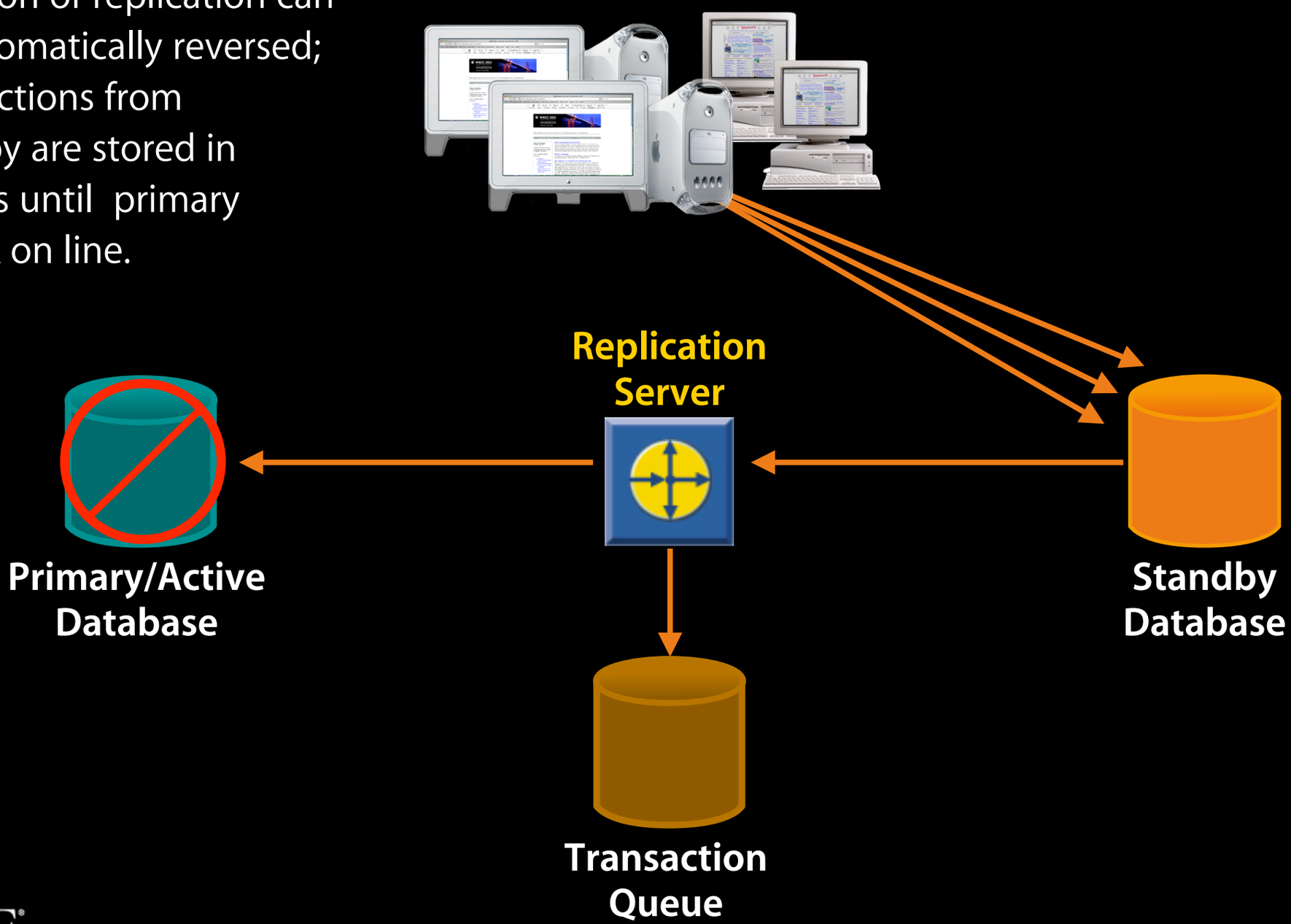
Warm Standby

- Bi-Directional Synchronization—FAILOVER

Automatic client-side failover;
Direction of replication can be automatically reversed;
Transactions from standby are stored in queues until primary is back on line.



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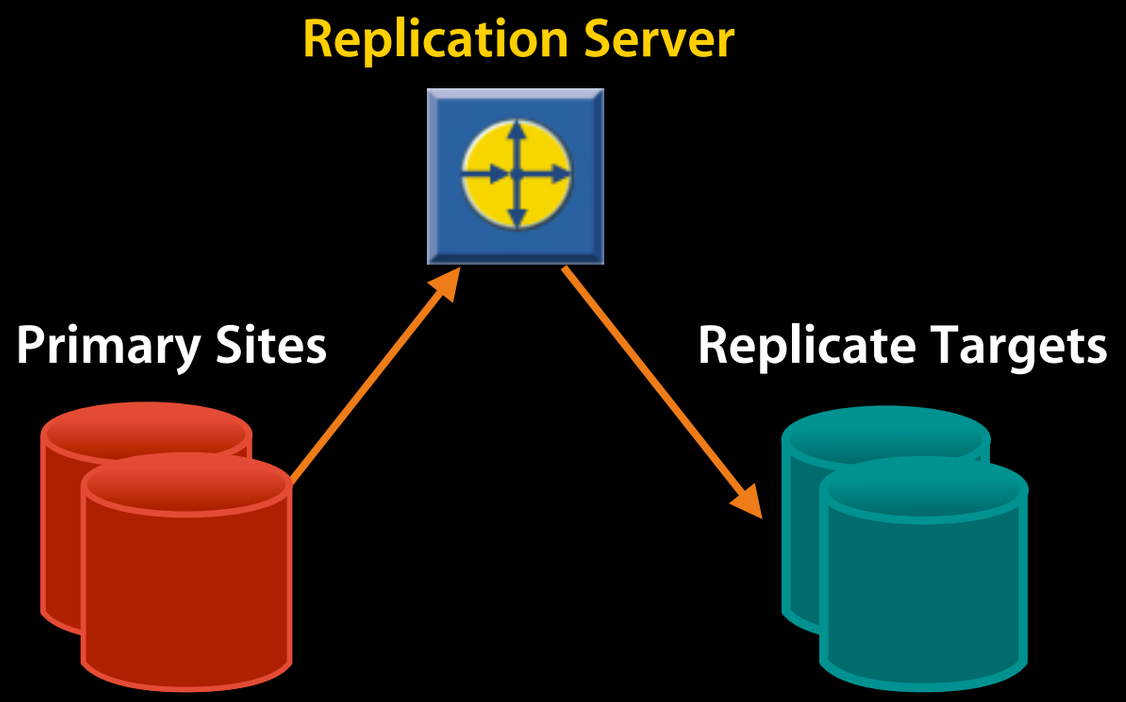
Replication System Architecture

- Complete data movement architecture and management
- Proven technology—1000's of installed sites
- Complete enterprise support from mainframes to mobile and occasionally connected users



Adaptive Server Enterprise
Adaptive Server Anywhere
Oracle
SQL Server
DB2
Informix
Rep Toolkit for MVS

Adaptive Server Enterprise
Adaptive Server Anywhere
Adaptive Server IQ
Oracle
SQL Server
DB2
AS/400
Informix
ODBC, DRDA

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Sybase—Provided Development Tools

- JDBC
  - jConnect: Type 4 (all java) driver; JDBC 2.0 compliant
- ODBC
  - Licensed from Open Link Software; ODBC 3.5
- Open Client
  - Sybase proprietary API for C/C++ developers
- Open Server
  - Sybase toolkit for building custom servers
  - handle connect, rpc, language, cursor, dynamic and attention events from clients
  - Preemptive threading model; uses native threads (pthreads)

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Other Tools and Solutions

- Tools
  - Apple - WebObjects - plugin for ASE; using jConnect driver
  - REALsoft - REALbasic - Sybase-provided plugin for ASE
  - Run-Time Labs - MacSQL Framework ASE support
  - Blueworld - Lasso - ASE support
  - Others
- Solutions
  - PowerEasy—**http://www.powereasy.com**
  - Inoveon—**http://www.inoveon.com/InoveonInTheNews.html**
  - RiskWise—**http://www.riskwise.com**
  - Quadbase—**http://www.quadbase.com**
  - Tolis Group—BRU—**http://www.tolisgroup.com**
  - LiveTime—**http://www.livetime.com**
  - MindWrap–**http://www.mindwrap.com**

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Migrating from SQL Server to ASE

- Because of common heritage, still high degree of compatibility between two RDBMS'
- Schema and data migration tools available from:
  - Schema Research—SR:Migrate
    - java-based, runs on any platform (Mac OS X, Linux, Windows)
  - Sybase—PowerDesigner with PowerTransfer plugin
    - C++-based, runs only on Windows
- Tools extract schema information from source server (SQL Server, Oracle, DB2, other) and create schema in ASE
- Both will transfer data from source to target ASE

Case Studies

Steve Olson

olson@sybase.com

http://developer.apple.com/wwdc2003/urls.html

Case Studies

- PowerEasy—Enterprise Resource Planning (ERP) solution for small-to medium businesses

- Inoveon—Retina scan/previous system for detecting diabetes

- Schema Research—High-availability solution for manufacturing facility

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PowerEasy

- Only ERP application available for Mac OS X
- Packages include (not a complete list):
  - ECommerce
    - Storefront, catalog management, order management, ERP Integration
  - Logistics
    - Inventory, shipping, procurement
  - Financials
    - General ledger, accounts payable, accounts receivable
  - Sales
    - Sales order processing, contact management
- Plus extensive reporting capabilities

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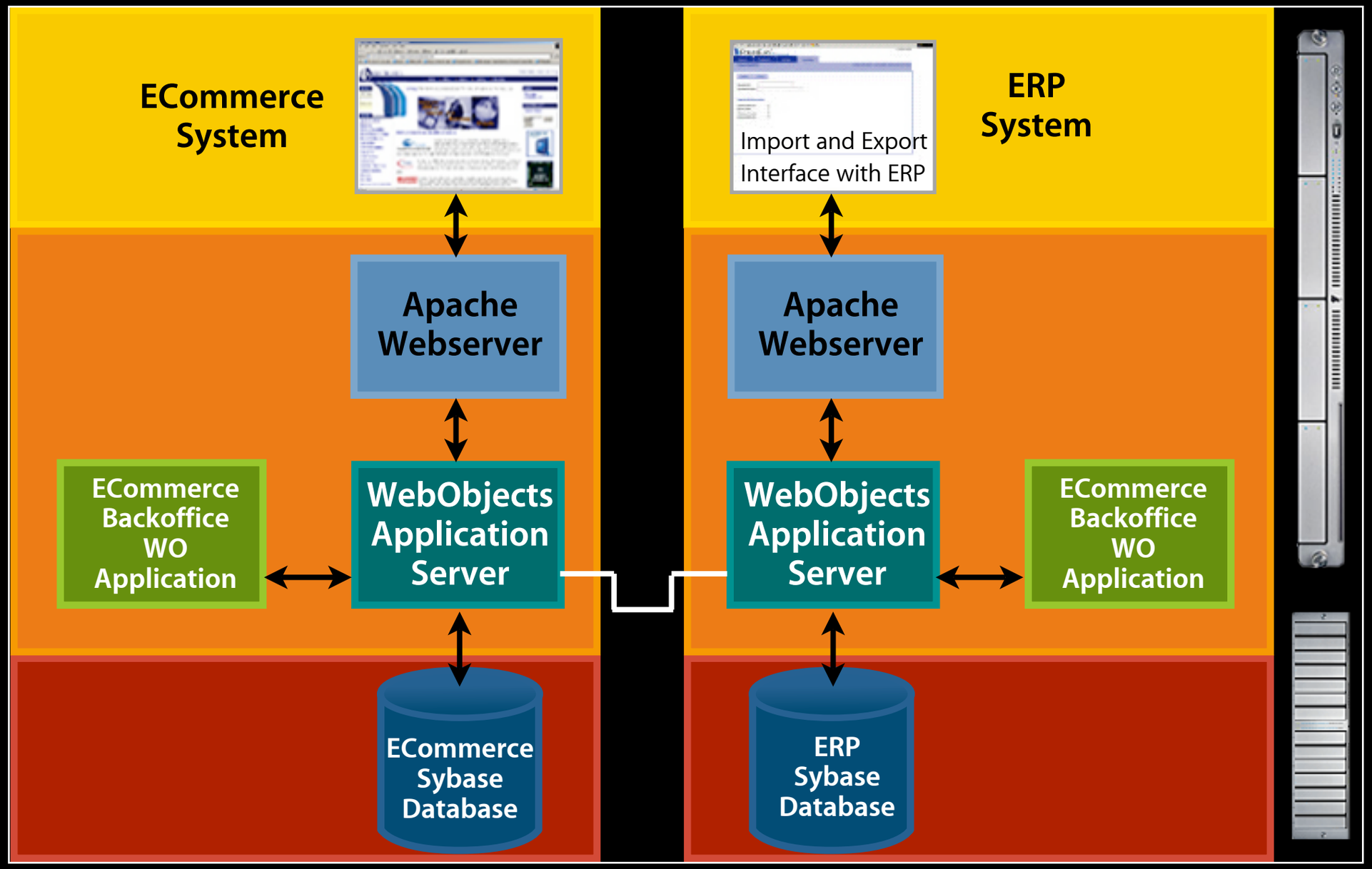
PowerEasy

Browser User Interface

Apache

WebObjects

Sybase Adaptive Server Enterprise



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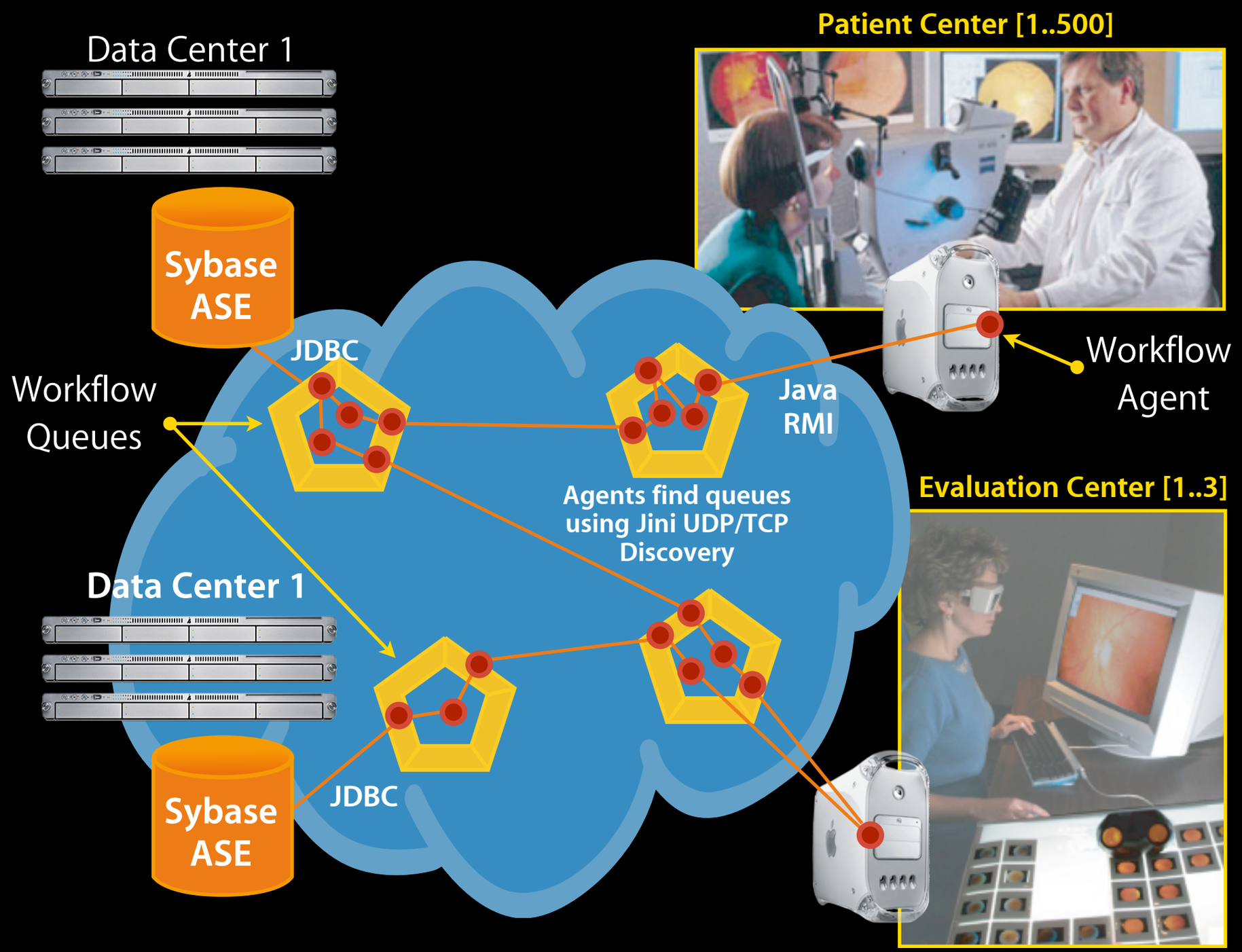
Inoveon Diabetic Retinopathic Service

- Diabetic Retinopathic Service:
  - Digital Stereoscopic Retinal Images
  - Test is 90% accurate; physician exams are 80% accurate
  - More accurate test results mean less unnecessary blindness
  - Healthcare market is very price sensitive
  - Lost data may mean blindness for the patient, and liability for Inoveon
- Sybase provides Inoveon with:
  - Enterprise-class scalability and reliability
    - Support for redundant datacenters
    - Confidence in data integrity and reliability
  - Cost effective, yet proven reliable solution

SYBASE

Inoveon Solution



SYBASE

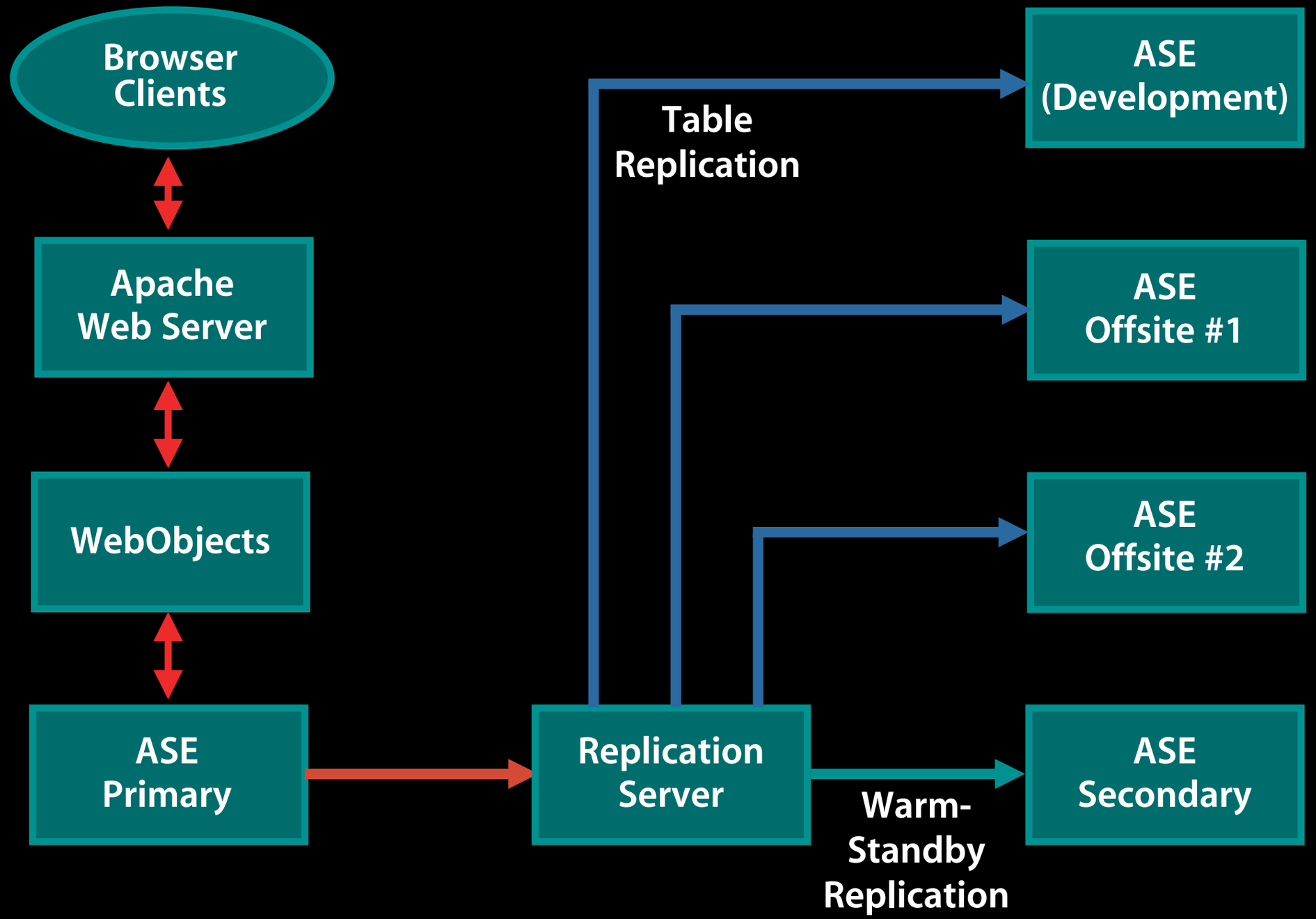
Schema Research

- Consulting firm, specializing in Sybase deployments
- Customer profile—manufacturing and distribution
  - Reliability and uptime critical
  - Finely tuned, timely data distribution
- Solution
  - Sybase ASE and Replication Server
  - Combination of RAID and ASE mirrors
  - Transaction logs every 15 minutes
  - WebObjects with fail-over
  - Headless 1U servers (Xserve) with UPS

SYBASE

Schema Research

Customer deployment architecture



SYBASE

Summary

- Sybase is committed to the Mac OS X platform
- The same software that is in use today by our most demanding customers is available to you on Mac OS X
- Sybase is leveraging the Mac OS X platform to provide the greatest level of integration possible between the operating system, database and desktop
- We are working with 3rd party tool- and solution-providers to enhance the value of the combined Sybase/Apple platform
- We will make it easy for you to eliminate your database dependency on SQL Server and switch to Adaptive Server Enterprise under Mac OS X!
- You can download the Developer's Edition of Adaptive Server Enterprise today from http://www.sybase.com/mac

SYBASE

Who to Contact

Steve Olson
Director of Development, Sybase
olson@sybase.com

Darryl Salas
Systems Consultant, Sybase
dsalas@sybase.com

Michael Haines
Worldwide Business Development, Sybase
mhaines@sybase.com

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http://developer.apple.com/wwdc2003/urls.html

Reference Library

- Downloads
  - Sybase Adaptive Server Enterprise Developer's Edition
    - http://www.sybase.com/mac
- Documentation
  - Sybase Adaptive Server Enterprise Reference
    - http://sybooks.sybase.com/asg1250.html
  - Rendezvous
    - http://www.apple.com/macosx/jaguar/rendezvous.html
  - SNMP
    - http://www.dartware.com/net-snmp/
  - Open Directory
    - http://www.apple.com/server/macosx/opendirectory.html

Q&A

http://developer.apple.com/wwdc2003/urls.html

WWDC 2003

Worldwide Developers Conference